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## SOME PINEAPPLE PROBLEMS.

## 9th ARTICLE. - TIME AND METHOD OF APPLYING FERTILIZERS.

By Henry C. Henricksen.

TIME OF APPLICATION. - It is reasonable to suppose that the plant is not capable of taking up nutrients from the soil until some roots have formed. The correctness of that supposition has been checked by experiments. Therefore, the first application of fertilizer is governed by root developments, and with favorable soil and moisture conditions it can be made four to six weeks after planting. As all soils contain some plant nutrients, the plants are not liable to suffer if fertilizing is delayed a week or two, but results obtained in this investigation show that the best growth is secured where liberal amounts of nitrogen and potash are supplied at an early date.

To help realize what liberal amounts are, the following illustration will serve: If the plants are set 18 x 18 inches in seven-foot beds, four rows to the bed and six feet between beds, there are 11,000 plants per acre, occupying a space of 23,455 square feet. As the greater portion of the roots are formed in the surface six inches, the soil, in which plant nutrients are most needed, amounts to but 11,727 cubic feet per acre. If that weighs 40 kg. per cubic foot, the total weight will be, approximately, 460,000 kilograms.

It was stated in the 7th article of this series that the soil should contain about 50 mg. nitrogen and 100 mg. potassium per kg. soil. That would in this case be 23 kg. nitrogen and 46 kg. potassium, which amounts can be supplied by about 1/3 oz. each ammonium sulfate and potassium sulfate per plant. That does not necessarily establish a formula for general use for there may be much more present in a soil, of one ingredient than of another, at <sup>a</sup> given time. But soil that is entirely devoid of nitrogen and potassium will contain, approximately, the needed amounts of these after an application of 1/3 oz. each ammonium sulfate and potassium sulfate per plant. The amounts that will be present a week or a month hence will depend upon how much is lost by washing and leaching and how much is taken up by the plants. The washing can, as stated in a former article, be estimated by an intelligent observer, and the leaching can also be estimated if the retentivity of the soil is known. Nothing is lost by leaching except when the precipitation is greater than the water holding capacity of the soil. When several inches of rain falls in a short time, some leaching of plant nutrients is inevitable, but it is variable for different soils because some are much more retentive than others. Also the retentivity varies with different salts; nitrates are leached out to a greater extent than are ammoniates and potash salts.



As to the amounts used by the plant, no definite data is available. That potash must be present in greater amount than nitrogen does not necessarily mean that the plant uses more of it; it may be found perhaps that the potash supply will not be exhausted as soon as the nitrogen supply. These problems are under investigation and will be reported upon at a later date. At this time the writer wishes especially to suggest that it will pay to watch the fields. Wherever the acreage is extensive enough an analysis ought to be made, as recommended in article 7 of this series, when there is a doubt about fertilizing. The present method of fertilizing at stated intervals is not the most economical.

**METHODS OF APPLICATION.** - As pineapple plants are not usually fertilized until some time after being set, the fertilizer cannot be scattered broadcast without some of it lodging in the plant. Therefore, the general practice is to apply it with a spoon between the plants, for inorganic salts when lodging on the leaves may cause injury. That method is tedious and costly, for which reason experiments have been made for the purpose of finding a cheaper method. The results of this work are as follows: Ammonium sulfate, when applied alone in the heart of the plants, causes severe injury; the different grades of acid phosphate also cause injury but less than ammonium sulfate. Bone meal, on the other hand, is not injurious and potassium sulfate practically not. A mixture of any of the inorganic salts named is liable to cause more or less injury unless some organic material is mixed with it. For that purpose any finely powdered organic material is suitable, such as sawdust, the fine material from coconut fibre factories, sugar bagasse, pulverized muck, etc. Powdered clay is also suitable; in fact, two parts sawdust and one part powdered clay is an excellent substitute for cotton seed meal in the hearts of young plants. For older plants a mixture of sawdust and clay, two to one, with 1/3 oz. each ammonium sulfate and potassium sulfate has been found to cause no injury when applied in the heart or scattered broadcast over the bed. According to that it should be possible to apply the fertilizers with a drill. That will be tried as soon as a suitable machine is obtained and the results will be reported upon later.

